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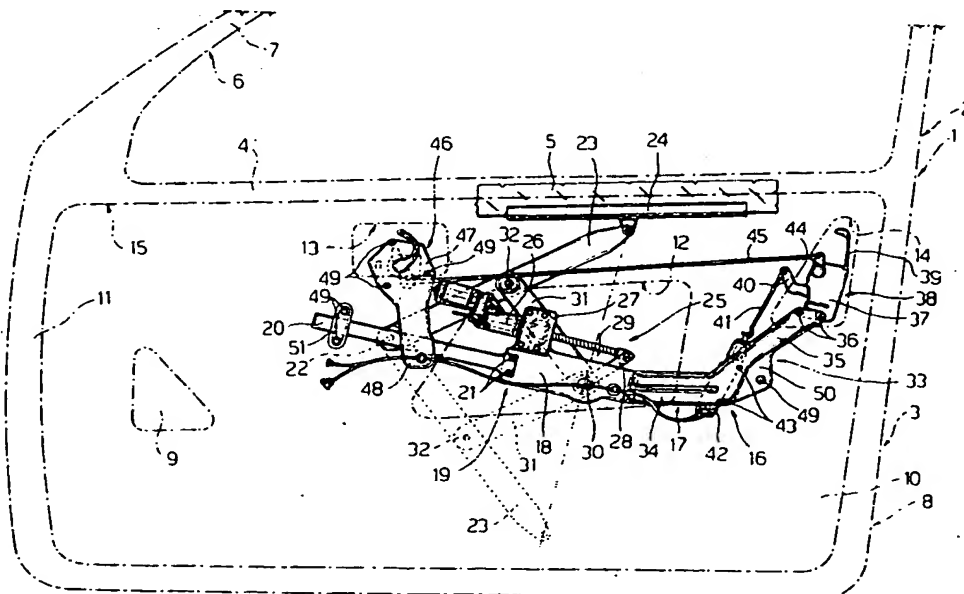
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54 **Preassembled operating panel for vehicle doors.**

57 On a vehicle door (1), a preassembled operating panel (16), housed inside the hollow bottom portion (3) of the door (1), presents door lock mechanisms (38, 42, 46), a device (19) for regulating and guiding the sliding window (5) of the door (1), and a central load-bearing element (17) consisting at least partly

of a portion (18) of the window regulating device (19) and having elements (49) for connecting the operating panel (16) to the door (1); the door lock mechanisms (38, 42, 46) being fitted to the central load-bearing element (17).



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The present invention relates to a preassembled operating panel for vehicle doors.

Vehicle doors are known to comprise an inner and outer metal sheet clinched and welded together to form a frame, the top portion of which defines a window frame fitted with a window sliding between the two sheets, and the bottom portion of which defines the frame of a box-section body comprising an inner and outer panel integral with the bottom frame. The outer panel forms the bottom portion of the outer sheet, and defines the outer shape of the door, while the inner panel forms the bottom portion of the inner sheet, and presents a number of openings through which to fit the working parts of the door (lock, window regulator, etc.) inside the gap on the box-section body. Once the working parts are assembled, the inner panel is fitted with a finish panel normally made of synthetic material and the inner surface of which normally incorporates finish components such as armrests, handles, etc.

In recent times, mainly for the purpose of speeding up on-line assembly and subsequent testing and setup, doors have been devised wherein the inner panel, formerly an integral part of the door structure, is replaced by a preassembled operating panel assembled by means of screws or similar removable fasteners, and fitted with the lock and window regulating and guide devices.

The load-bearing structure of the bottom portion of doors of the aforementioned type is thus reduced to an outer sheet, and an inner sheet clinched and welded peripherally to the outer sheet and having an opening extending over substantially the entire bottom portion of the door. On such doors, the opening formed in the inner sheet is partially closed by the operating panel connected to the inner sheet, while the inside of the door is defined as before by the finish panel.

Though widely used, known doors of the aforementioned type present several drawbacks both technically and economically. In particular, removal of substantially the entire bottom portion of the inner sheet for assembling the operating panel drastically reduces the torsional resistance of the load-bearing structure of the door, so that automated assembly and welding of the door involve the use of high-cost automatic handling solutions.

It is an object of the present invention to provide a preassembled operating panel of such shape and size as to minimize the size of the openings formed, for its assembly, through the inner sheet of the door.

According to the present invention, there is provided a preassembled operating panel for vehicle doors, the operating panel being designed for fitment to a door presenting a top opening, and a bottom portion comprising a box-section body

wherein an outer panel and an inner panel define a chamber communicating externally through openings formed in the inner panel; the operating panel being designed for fitment inside the chamber, being fitted with door lock mechanisms and a device for regulating and guiding a sliding window closing the top opening, and being characterized by the fact that it comprises a central load-bearing element consisting at least partly of a portion of the window regulating device; the central load-bearing element presenting means for connecting the operating panel to the door; and the door lock mechanisms being connected to the central load-bearing element.

By virtue of a portion of the window regulating device supporting all the other working parts of the door, the shape and size of the operating panel as described above are such as to enable it to be assembled by removing only a relatively small portion of the inner sheet of the door, so that the bottom portion of the door preserves a substantially shell type structure of relatively strong torsional resistance.

The present invention will be described with reference to the accompanying drawing, which shows a schematic side view, from inside, of a non-limiting embodiment.

Number 1 in the accompanying drawing indicates a vehicle door comprising a top portion 2 and a bottom portion 3 separated by a substantially horizontal cross member 4 having a longitudinal opening (not shown) through which is fitted a sliding window 5.

Top portion 2 presents an opening 6 surrounded by a substantially U-shaped frame 7 having its concavity turned downwards and facing cross member 4, and which is integral with cross member 4 at the bottom end.

Bottom portion 3 of door 1 consists of a box-section body 8 defined by an outer sheet metal panel 9 and an inner preferably sheet metal panel 10, the lateral and bottom edges of which panels are connected to form a frame 11, and the top edges of which define cross member 4. Panel 9 defines the bottom outside part of door 1, while panel 10 presents a central opening 12, substantially in the form of a rectangular trapezium and the height of which is relatively small as compared with that of bottom portion 3 of door 1, and a further two openings 13 and 14 located on either side of opening 12 and adjacent to cross member 4.

Openings 12, 13 and 14 enable access from the outside to a chamber 15 defined in frame 11 by panels 9 and 10 and housing a preassembled operating panel 16 inserted, at the assembly stage, inside chamber 15 through opening 12.

Panel 16 comprises a central load-bearing element 17 defined partly by a central load-bearing

bracket 18 substantially in the form of an elongated rectangle and forming part of a known so-called "compass" type window regulating device 19. Device 19 also comprises a slideway 20 extending axially from a first longitudinal end of bracket 18 and beneath opening 13, and connected to bracket 18 by screws 21; and a slide 22 mounted on slideway 20 and hinged to one end of an arm 23, the other end of which is hinged to the bottom edge of window 5 via the interposition of a connecting bracket 24. Device 19 also comprises an actuating device 25 for rotating arm 23, in relation to slide 22, between a first position (shown by the continuous line) wherein window 5 is set to the top limit position closing opening 6, and a second position (shown by the dotted line) wherein window 5 is set to the bottom limit position and opening 6 is fully open, and through an intermediate position (not shown) wherein arm 23 is aligned over slideway 20 and bracket 18.

Actuating device 25 comprises a known linear actuator 26 pivoting on a lateral appendix 27 of bracket 18 and having an axially-reciprocating output element hinged at its free end to a first arm 28 of a square rocker arm 29. Rocker arm 29 pivots centrally at 30 on bracket 18, and comprises a second arm 31 hinged at its free end to a point 32 along the center line of arm 23.

In addition to bracket 18, central element 17 also comprises a second bracket 33 connected in removable manner to the longitudinal end of bracket 18 opposite that fitted with slideway 20. According to a variation not shown, brackets 18 and 33 are integral with each other, and constitute respective portions of a single metal plate.

Bracket 33 is substantially L-shaped, and comprises a substantially horizontal bottom arm 34 constituting an extension of bracket 18; and a top arm 35 extending upwards as far as opening 14 and from the end of arm 34 opposite that connected to bracket 18.

The top end of arm 35 is connected by screws 36 to the body 37 of a known lock 38 of door 1. Lock 38 is located at opening 14, and presents a top lever 39 for connection to an outside handle (not shown); a first lock lever 40 connected by tie 41 to the output of a known electric door lock device 42 connected by screws 43 to arm 34 of bracket 33; and a second operating lever 44 connected by tie 45 to a known inside handle device 46 for operating lock 38. Handle device 46 is located at opening 13, and comprises a plate 47 having an appendix 48 connected integral with a mid point of slideway 20.

Operating panel 16 thus consists of window regulating device 19, bracket 33, lock 38, door lock device 42 and handle device 46, which combine to define a single integrated elongated element fit-

table inside chamber 15 through opening 12, and having fastening points 49 for assembly to door 1 formed in a central lateral appendix 50 of bracket 33, in plate 47, and in a U bolt 51 integral with slideway 20.

Door 1 as described above therefore provides for all the advantages of a preassembled, pretested operating panel, while at the same time preserving maximum torsional stability of the door, by virtue of the shape and size of operating panel 16 requiring only a small assembly opening 12 as compared with the overall size of inner panel 10 of door 1. This is also made possible by using a compass type window regulating device which, when arm 23 is set to the intermediate position, minimizes the width of operating panel 16.

### Claims

1. A preassembled operating panel (16) for vehicle doors (1), the operating panel (16) being designed for fitment to a door (1) presenting a top opening (6), and a bottom portion (3) comprising a box-section body (8) wherein an outer panel (9) and an inner panel (10) define a chamber (15) communicating externally through openings (12, 13, 14) formed in the inner panel (10); the operating panel (16) being designed for fitment inside the chamber (15), being fitted with door lock mechanisms (38, 42, 46) and a device (19) for regulating and guiding a sliding window (5) closing the top opening (6), and being characterized by the fact that it comprises a central load-bearing element (17) consisting at least partly of a portion of the window regulating device (19); the central load-bearing element (17) presenting means (49) for connecting the operating panel (16) to the door (1); and the door lock mechanisms (38, 42, 46) being connected to the central load-bearing element (17).
2. An operating panel (16) as claimed in Claim 1, characterized by the fact that said central load-bearing element (17) comprises a first bracket (18) of the window regulating device (19), and a second bracket (33) connected integral with the first bracket (18); the second bracket (33) at least partly supporting said lock mechanisms (38, 42, 46).
3. An operating panel (16) as claimed in Claim 2, characterized by the fact that said first (18) and second (33) brackets are elongated in shape; the second bracket (33) being connected to a longitudinal end of the first bracket (18).

4. An operating panel (16) as claimed in Claim 3, characterized by the fact that said window regulating device (19) is a compass type, and comprises a slideway (20), a slide (22) mounted on said slideway (20), and an arm (23) connected to said slide (22) and for operating the sliding window (5); said slideway (20) extending from the first bracket (18) on the opposite side to the second bracket (33).

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5. A vehicle door (1) presenting a top opening (6), and a bottom portion (3) comprising a box-section body (8) wherein an outer panel (9) and an inner panel (10) define a chamber (15) communicating externally through openings (12, 13, 14) formed in the inner panel (10); characterized by the fact that it comprises an operating panel (16) fitted inside said chamber (15) and having door lock mechanisms (38, 42, 46) and a device (19) for regulating and guiding a sliding window (5) closing the top opening (6); the operating panel (16) being formed according to any one of the foregoing Claims.

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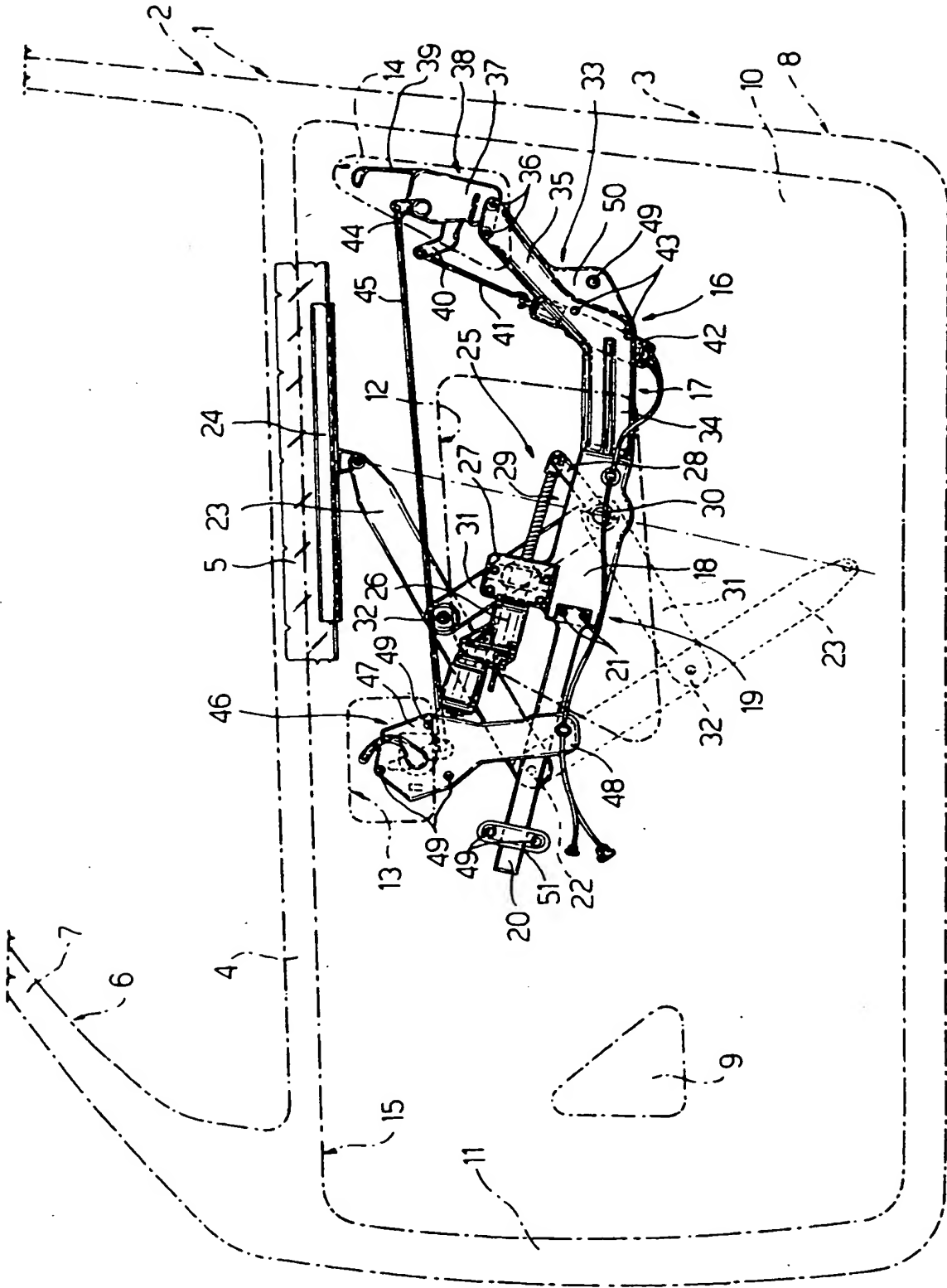
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## EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 93104701.3
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	<u>EP - A1 - 0 385 823</u> (ROCKWELL-CIM) * Totality *	1,2,5	B 60 J 5/00
X	<u>EP - A2/A3 - 0 427 153</u> (ROLTRA-MORSE S.p.a.) * Totality *	1,2,5	
X	<u>US - A - 5 095 659</u> (BENOIT, VINDEN) * Fig.1,4,5; claims *	1,2,5	
X	<u>DE - A1 - 3 217 640</u> (BROSE FAHRZEUGTEILE GMBH & CO KG) * Fig. 6,7; abstract *	1,2,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 60 J
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 28-06-1993	Examiner SCHMICKL
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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